BOOK REVIEWS

Dr. A. F. M. REIJNDERS, Les Problèmes du Développement des Carpophores des Agaricales et de quelques Groupes voisins. Avec une préface de Roger Heim. Publ. Dr. W. Junk, The Hague, 1963. XV + 412 p., 55 pl. Price *f* 60.—.

This remarkable book consists of four parts: In the Introduction the historical backgrounds of the study are discussed. Moreover, the methods used in the author's own investigations are mentioned, especially the treatment and staining of the cross-sections. The technical terms, used in the text, are explained in an alphabetical list.

Part two describes the development of the carpophores of 76 Basidiomycetes belonging to the Agaricales and to *Cantharellus*. These descriptions, all of them based on the author's own investigations, are illustrated by a large number of microphotographs filling 55 plates. Unfortunately, the quality of some of the photographs leaves much to be desired, especially those made with a high magnification.

The third part contains a synoptic list of data partly collected from the literature and partly obtained from the author's own investigations discussed in part two. The list runs to 76 pages and includes about 300 species belonging to the genus *Cantharellus*, to the Agaricales sensu Singer (1962) and to a few families of the Gastromycetes (Secotiaceae, Hydnangiaceae). Besides the name of the fungus (with author and sometimes also with synonyms) the morphology, shape and development of the primordia and of the mature stage of the carpophores are given. Moreover, short descriptions are added of the type of development (gymnocarpous and various angiocarpous types), the morphology of the young and full-grown lamellae and their development, the morphology of the trama in stipe, pileus and lamellae, etc.

In the fourth, general, part all the data are discussed at some length; from this part an extensive English summary is given (p. 369–382). In this part the author discusses the literature on the development of the various carpophores, compares these data with the results of his own investigations and expounds his ideas on the significance and function of the different stages and parts of the carpophores. He also discusses physiological and phylogenetic problems, especially the relationship of the different families of the Agaricales and the connection of the Agaricales with some fungi placed in the Gastromycetes. He supports the theory that the last-mentioned fungi are descended from the Agaricales.

The book ends with a voluminous list of literature and with indices of the authors, the botanical names and the technical terms. The book is well got-up and bound in cloth.

Especially the fourth part of the book is of interest as it contains a complete and therefore very useful compilation of our knowledge with regard to the carpophore development and with regard to the relationship of the Agaricales so far as this can be deduced from the development. Surely, everybody working with agaric fungi will welcome this book which will prove to be indispensable to him in future. The book should find a place in every botanical library.

J. A. VON ARX

R. E. HOLTTUM. Flora Malesiana Series II – Pteridophyta. Vol. I²: *Cyatheaceae*. P. Noordhoff, Groningen, Dec. 1963. 112 pp., 34 figs. Price 25 sh.

The classification of the tree-ferns of the family *Cyatheaceae* in genera has been a moot point for many years. The three genera usually recognized: *Alsophila*, without an indusium; *Hemitelia*, with a one-sided scale-like indusium, and *Cyathea*, with a complete, salver-shaped to globular indusium, have been challenged by various authors, notably COPELAND and DOMIN, who claimed that such single-character genera were artificial. The evidence was, however, largely negative. HOLTTUM, in his revision of the Indo-Malayan Cyatheas, has now presented positive arguments. His subdivision of *Cyathea sensu lato* (i.e., including *Alsophila* and *Hemitelia*) is mainly based on the nature of the stipe-scales (see Kew Bull. 1957: 41), with additional characters in the hairs and the venation. The indusial character is then shown to vary widely in each group. The characters employed for distinguishing the sections and subsections may sometimes hardly seem to be of fundamental importance; yet in ferns, which are usually of simpler structure than Angiosperms, such characters are often very useful for distinguishing apparently natural species groups, and there seems hardly to be an objection against calling them sections and subsections. In Malaysia 2 subgenera and 4 sections are represented. HOLTTUM recognizes 191 species, and in view of the fact that many of them are only known by the type collection, the number is likely to be greater, although a few species seem only doubtfully distinct.

Another, more fundamental novelty of the present treatment is the re-inclusion of the *Dicksoniaceae* in the *Cyatheaceae*. They were formerly united, mainly because they shared the arborescent habit and the structure of the sporangium, but after BOWER had emphasized the differences between the ferns with superficial and those with marginal sori, most authors classed them in a separate family, often far removed from the other tree-ferns. The morphological and particularly anatomical arguments in favour of their close affinity were expounded in a recent, extensive article by HOLTTUM & SEN (Phytomorphology 11: 406, 1961).

The principles employed in the classification of the Malaysian species of *Cyathea* were brought together by HOLTTUM in a synoptic paper (Am. Fern Jo. 54: 1, 1964), to which the interested reader is referred.

The author is to be congratulated on the completion of a very difficult task which was undertaken very painstakingly and has yielded a most original regional monograph.

K. U. KRAMER

K. BERTSCH, Flechtenflora von Südwestdeutschland. 2. Aufl. Verlag Eugen Ulmer, Stuttgart, 1964. 251 S., 66 Abb. DM 20.—.

Die zweite Auflage (die erste wurde nicht in den "Acta" besprochen) ist völlig neubearbeitet; die Zahl der beschriebenen Arten hat sich von 1093 auf 1290 erhöht. Das Buch enthält eine Übersicht des Flechtensystems und Bestimmungsschlüssel, auch für sterile Flechten. Am Ende jedes Gattungsschlüssels werden die Arten mit Fundortsangaben aufgezählt. Leider fehlen Standortsangaben und Artbeschreibungen, oder letztere sind äusserst kurz. Die Sporengrösse wird merkwürdigerweise in Millimetern angegeben. Die Habitusbilder der Flechten sind mässig bis schlecht. Es fehlt eine Einführung in die Morphologie und Anatomie,

sowie eine erklärende Liste von Fachausdrücken. In einer puristischen Aufwallung hat der Autor alle Fremdwörter durch deutsche ersetzt, welche zum Teil entweder gekünstelt anmuten, wie z.B. "Füllfäden" (Paraphysen) und "Spaltsporbehälter" (Pyknidie), oder wenig klar sind, wie "Warzen" und "Sprossungen" für Isidien. Ich habe vergebens nach Übersetzungen gesucht für die Begriffe Epithezium, Pseudocyphelle und Cephalodie; sie werden überhaupt nicht erwähnt.

Die Schlüssel sind im Allgemeinen ziemlich gut. Leider wird aber zu oft schon im Anfang eine Trennung in Gesteins- und Rindenflechten gemacht. Wehe demjenigen, der *Physcia ascendens* auf einem Stein oder *Physcia dubia* oder *caesia* an Baumrinde findet: er gerät in eine Sackgasse hinein. Beim Schlüssel der *Parmeliaceae* wird angegeben, dass die Thallusmitte bei *Parmeliopsis* völlig staubig aufgelöst ist; *Parmeliopsis aleurites* wird man dort also nicht suchen. Andererseits kommt man mit *Physcia clementi* und *elaeina* auf *Parmeliopsis*, wenn man die Tabelle für sterile Blattflechten benutzt. Mit der Tabelle für sterile Krustenflechten kann man *Lecidea quernea* nicht richtig bestimmen; der Autor führt den Gebraucher unmittelbar nach *Ochrolechia*. Es ist übrigens erstaunlich dass eine so gemeine Erdflechte wie *Lecidea granulosa* in diesem Schlüssel fehlt. Bei *Chaenotheca melanophaea* ist die Farbe (ockergelb) nicht richtig angegeben, wodurch man fehl geht. Die Sorale von *Parmelia revoluta* sind nicht flächenständig, sondern meistens endständig.

Varietäten werden hier zu Unrecht als Arten aufgeführt, z.B. *Parmelia ceratea*. Dagegen werden gute Arten, wie *Cornicularia muricata* und *aculeata*, zu einer Art zusammengefasst. Die Nomenklatur ist meistens korrekt, es kommen aber auch viele ungültige Namen vor, wie *Physcia obscura* für *Ph. ciliata*, *Ph. leucoleiptes* für *Ph. detersella*, *Ph. astroidea* für *Ph. clementi*, *Parmelia andreana* für *P. flaventior*, *Parmelia aspidota* für *P. aspera*.

Im Schriftenverzeichnis sind einige lokale und Weltmonographien erwähnt, aber andere wie Maas Geesteranus (*Parmeliaceae*, *Physcia*), Degelius (*Collema*) und Sandstede (*Cladonia*) fehlen. Auch die guten deutschen Flechtenfloren von Anders, Erichsen und Hillmann und Grummann sucht man dort vergebens. Der Leser sollten sich gut merken, dass im Register alle Cattungen aufgenommen worden sind, aber nur diejenigen Arten, die vom Autor im Texte unter anderen Gattungen aufgeführt werden. Es wird dies nicht betont.

Diese Flora ist für die Kenntnis der Flechtenverbreitung in Südwestdeutschland unentbehrlich. Als Bestimmungsbuch ist sie der Arbeit Erichsens und besonders der Flora von Hillmann und Grummann unterlegen. Nur der Preis ist weitaus günstiger. Für Anfänger ist dieses Buch sicher zu empfehlen.

J. J. BARKMAN

V. H. Heywood and R. E. G. Pichi-Sermolli, Proceedings of the Second Flora Europaea Symposium, Webbia 18, 1963, p. 1–562.

The first Flora Europaea symposium was held in Vienna in 1959, the second of which this book gives a survey, took place in Genova, May 1963.

Part 1, p. 1–93, contains the reports and pertaining discussions on the following subjects: 1. The need for check-lists of the flora of certain European territories, by D. A. Webb. 2. Abstracting and indexing data, by S. M. Walters. 3. Lexicon polyglottum. 4. The treatment of alien species in Flora Europaea, by D. A. Webb. 5. Extra-European distribution.

The following papers were read: 1. The treatment of hybrids in Flora Europaea, by D. H. Valentine. 2. Hybridation introgressive dans la flore de l'Europe Orientale, by E. G. Borrov. 3. Considérations géographiques et systématiques sur la flore de l'Italie du Sud, by G. Moggi. 4. Über die Beziehungen zwischen italienischen und iberischen Arten der Gattung Limonium (Plumbaginaceae), by S. Pignatti.

Part II, p. 94–562, gives a survey of taxonomic and floristic research in Europe since 1945. It consists of the reports of 25 Regional Advisers about the floristic situation in their respective countries; that for the Netherlands has been compiled by S. J. van Ooststroom. Some of the reports are fairly short, as for instance that of Norway, which is confined to a supplement on Blake's Geographical guide to the flora of the world, and that of France, which only gives a list of new taxa described in that country since 1945.

On the other hand, the report of Britain gives a detailed survey of works on the origin and history of the flora, general floras, local floras, illustrations, plant lists, bibliography, conferences held by the Botanical Society of the British Isles, the distribution maps published by that Society, taxonomic revisions and monographs, biometric, experimental, and cytotaxonomic studies, a list of new taxa described from Britain, plants new to Britain, native and alien, distributional and population studies.

For most of the countries the reports are less detailed than that of Britain, but, as Heywood says in his introduction: "Together they make a formidable volume which should serve as an invaluable source of references for years to come".

TH. J. REICHGELT

H. A. GLEASON and A. CRONQUIST. Manual of vascular plants of Northeastern United States and adjacent Canada. D. Van Nostrand Co., Inc., Princeton, N.J., 1963. LI + 810 pp. Price 92 sh.

This work is essentially a condensation by the junior author of the senior author's New Britton & Brown Illustrated Flora into a field manual. The area covered has been slightly expanded to the North and the West, and in many cases the taxonomic treatment has been brought up to date with newly gained insight. In this the junior author was assisted by a number of specialists.

All essentials of the large flora, the glossary, the family keys, the family sequence, the concise yet sufficiently extensive descriptions of families, genera, and species, have been retained. Much space was saved by omitting all illustrations, these not being regarded as essential for a field manual, general and critical notes on families and genera, etc., and by using small print. The notes on ecology and distribution are given in the same way as in the large flora. With every family and genus reference is made to the volume and page of the large flora where the group is treated, certainly a great convenience for the reader wishing to confirm his identification with its excellent figures.

The publication of this flora will undoubtedly be welcomed by all wishing to use "Britton & Brown" in the field and by those for whom the price of the large flora is prohibitive.

K. U. KRAMER

LEO BRAUNER and FRANZ BUKATSCH, Das kleine Pflanzenphysiologische Praktikum, Anleitung zu bodenkundlichen und pflanzenphysiologischen Versuchen für Hoch-, Ober- und Fachschulen. 7. Auflage, durchgesehen und ergänzt von Dr. Franz Bukatsch, Ober-studienrat und Professor der Universität München. Mit 150 Abbildungen im Text. VIII, 288 Seiten. L 6 = 16,7 × 24 cm, 1964. Lederin 26,60 DM.

In de nieuwe druk van deze practicum-handleiding is het aantal experimenten, dat naar schatting 300 bedroeg, met ongeveer 10 uitgebreid. Deze zijn in het bijzonder bedoeld, om de studenten bekend te maken met nieuwe methodieken en recente resultaten van onderzoek, doch tevens heeft de schrijver in 5 hiervan aandacht geschonken aan de physiologie van de micro-organismen.

Dunne-laag chromatografie wordt toegepast bij de scheiding van bladkleurstoffen, de infiltratiemethode van Fröschel bij het aantonen van de openingstoestand van huidmondjes. Er zijn waarnemingen opgenomen van de invloed van Gibberellazuur op kieming, lengtegroei, beworteling van stekken, enz. en een nog niet eerder gepubliceerde methode voor het aantonen van luchtverontreinigingen met behulp van bacterie-luminiscentie.

De nieuwe experimenten sluiten wat eenvoud van opzet en uitvoering betreft geheel aan bij de rest van deze bij uitstek cursorische en op demonstratie ingestelde handleiding, waarvan de 6de druk besproken werd in Deel 12 van dit tijdschrift.

A. S. RODRIGUES PEREIRA

JOHN T. CURTIS, The Vegetation of Wisconsin; An ordination of Plant Communities. The University of Wisconsin Press, Madison, 1959. 657 pp., 53 figs., 66 plates, 30 text tables, appendix, glossary, bibliography, species list, index. Price $ 7.50.

"Don't miss this book on the false assumption that it is only of local interest". Thus the leading plant geographer S. A. Cain recommends this book of the late Professor John T. Curtis, formerly Director of the Plant Ecology Laboratory of the University of Wisconsin. In spite of this recommendation and the fact that the book was already published five years ago, it has received but little attention in the Netherlands.

Part 1, Background, consists of 4 chapters: Flora, Environment, Plant Communities and their Distribution, Vegetation Study Methods. Some important phytogeographical elements are discussed in relation to the history of the area; special attention is paid to a transitional zone throughout the state, separating a southwestern from a northern floristic province. This "tension zone" is clearly demonstrated by distribution maps. It can be read that the widely used (and misused) term ecotone has been developed, by Livingstone and Clements, for locating such boundaries of floristic provinces. With help of the recent terminology of Van Leeuwen (1964) this type of boundary can be interpreted as a complex limes convergence.

In the chapter on Plant Communities the individualistic hypothesis of plant communities, as expounded by Gleason, is introduced and worked out by Curtis and MacIntosh as the "vegetational continuum" concept. In addition the ordination method is exposed. This clear and realistic introduction is of great importance for the European vegetationist, who is more acquainted with the classificational approach.

The introduction of the cline concept in plant sociology by Westhoff (1947) is missed in the considerations. It is remarkable that Goodall (1963) in his recent paper on this subject also neglects this application in the classificational approach, that may be one of the possibilities to bridge the gap between both approaches. In Van der Maarel and Westhoff (1964) an example of cline application can be found.

In the system of plant communities erected by Curtis the priority of the physiognomic criterion is obvious, as can be easily seen in his "Key to Wisconsin Plant Communities". Subsequent criteria are the floristic provinces of Wisconsin, the structure of vegetation, the dominance of growth forms and, in some cases, the environment.

In total 34 communities are described in parts 2–6.

In the text composition, structure, environment and relations with other communities are treated.

In the numerous tables at the end of the book these data are conveniently summarised. The number of described communities is rather low as compared with the number of associations and subassociations of the Braun–Blanquet system as described in European countries of comparable size. It rather approximates the number of classes! (Cf. Ellenberg, 1963, with 38 classes for Middle Europe). This does not suggest, however, a resemblance between these two types of vegetational unit. It merely indicates that the community in the sense of Curtis is a rather broad conception. — On page 478 Curtis states that the Wisconsin communities are comparable to the alliances of the Braun–Blanquet system rather than to the associations. In my opinion each resemblance with Braun–Blanquet units must be doubted. —

For a European student of vegetation the Curtis conception will be too broad in many a case. This may be illustrated with the Lake Dune community as an example. The more detailed papers on Lake dunes as well as Curtis' brief descriptions do suggest an environmental and vegetational variety which is comparable to the situation in Dutch dunes. The list of prevalent species given by Curtis (table XX–2) suggests this as well. Here we can almost speak of a local floristic province, comparable to our Dutch Dune District, rather than to a community. Perhaps we may consider the vegetation typology by Curtis as a rough geographical-ecological description of a large and only recently well known area. As such it is admirable. But at the same time it is apparently no satisfying alternative for the European phytosociological approach.

The final part deals with the vegetation as a whole. It consists of three chapters, Postglacial history, The effect of man on the vegetation, and Interrelations of communities. Though Curtis himself states that in Europe pollen analysis has reached a high level of precision, as compared with that in the United States, his survey of vegetational history is very impressive. The next chapter forms a continuum with the former one and ends in a plea for nature conservation.

In the final chapter of the book the ordination method is dealt with more in detail and a lot of ordination data are presented, giving a "widespread support for the idea that vegetation must be studied as a continuum variable. This situation means that it is not possible to erect a classification scheme which will place the plant communities of any large portion of the earth's surface into a series of discrete pigeonholes, each with recognizable, describable characteristics, and boundary limitations". This is a challenge for the European phytosociologists.

Until more comparisons will have been published concerning ordination versus classification and until European classification will be based more on objective criteria, such as similarity coefficients, this challenge cannot be taken up effectively.

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E. VAN DER MAAREL

PIERRE DANSEREAU, Biogeography. An Ecological Perspective. The Ronald Press Company, New York. VII + 394 pp., 126 figures, 36 text tables, appendix, glossary, bibliography, name index, subject index. Price: $ 8.50.

It is somewhat difficult to discuss a book that was published almost seven years ago. It should be easily enough to indicate out-of-date considerations. Since however, there is a serious arrear in Holland in reviewing ecological publications and since the book of Dansereau is an important contribution to the general approach in ecology, it seems still worth to discuss it.

The general significance of the book is expressed by the author in his preface: "The principal objective is to provide senior and graduate students in these fields (i.e. plant and animal ecology and geography, EM) with a new synthesis of the environmental relationships of living organisms".

The outline of this synthesis gives the book its main value. Each student of ecology must become aware of the fascinating complexy character of his science while reading Danseraeu's book. The central theme is "the relation of plants and animals to their environment and of the dynamics of the environment itself". This theme is approached on five "levels of integration", the historical, the bioclimatological, the synecological, the autecological and the industrial. Consequently the book has been divided into five parts: History of Biota, Bioclimatology, Synecology, Autecology, and Mans's Impact on the Landscape.

Each part consists of about ten chapters, which have been compactly written and illustrated by a wealth of clear and often original tables, schemes and figures.

Part 1 is mainly concerned with general concepts such as floristic province, element, endemism. Part 2 deals with types of climate, life-forms and formations; together with part 1 it forms a well-balanced introduction to ecological plant geography.

Part 3 gives some introductory remarks on environmental dimensions and the ecosystem concept, but it is properly concerned with vegetation and soil. Especially structure, dynamics (with an account on climaxes) and composition of vegetation are extensively treated. The author favours, with some restrictions, the Braun–

Blanquet approach in analysis and synthesis. The continuum concept and the ordination method are just mentioned — since the publication of Dansereau's book ordination has made considerable progress!

Part 4 starts with a plea for a holocenotic approach in autecological studies. In European terms: the ethological approach is more important than the mesological one. Some types of adaptation, the main chemical and physical factors, some biological responses such as vitality and dispersal and some growth types are briefly discussed. In a chapter on "evolutionary opportunity" a stimulating treatment of the probable relations between the distribution, ecology and taxonomy of species and their evolutionary state is presented.

Part 5 deals with the noösphere; it is a good introduction to human ecology. Six levels of human interference are mentioned: gathering, hunting, herding, agriculture, industry and urbanisation. The human influence on landscape and ecosystem via such managements as burning, grazing, introducing species, is clearly demonstrated.

An appendix contains pictures and tables with phytosociological data of 14 typical Canadian plant communities. An extensive glossary is added to the text. This is the more useful since Dansereau has redefined a number of terms, generally giving them a comparatively narrow sense. Most of the proposed definitions hold to Dansereau's "central purpose", which is "to distinguish orders of magnitude in the environment and to maintain a consistent vocabulary in order to provide a coherent account of ecological relationships".

Since it is hardly possible to discuss the multitude of facts and problems, only some general remarks will be given. A first remark concerns the title: Is biogeography really the term that covers the book? Dansereau's definition seems to include a major part of ecology: "the study of the origin, distribution, adaptation and association of plants and animals" His definitions of plant- and zoogeography are comparatively strongly restricted. I should have preferred a title like "Bioecology, a geographical approach". Or even: Plant-ecology, since the bulk of facts and considerations comes from plant geography and plant ecology. Too little attention is paid to general zoo-ecological and geographical problems, such as speciation and geographical races, biotope equivalence, classification of biotic communities. Cf. the books of Balogh (1958) and Tischler (1955). The bibliography reflects this with only 5 % zoological publications.

In general few European contributions (only some tens) have been taken into account. This is, however, often the case with European books as well! E.g.: A comparable book by Schmithüsen (1959) contains 650 references, of which are 50 Anglo-american ones. Dansereau mentions a 400 references, of which no more than 30 are to be found in Schmithüsen; thus the "reference affinity", calculated with the Jaccard formula c/a–b–c, amounts only 3 %!

There are some definitions in the glossary which do not promote the badly needed agreement in ecological terminology, despite Dansereau's attempt towards consistency. This holds especially for the group habitat–biotope–synusia (the niche concept is missed), for the group ecosystem–biocenosis–association and for the group belt–zone–ecotone (the ecocline and catena concepts are missed). There seems to be a tendency, at least in European ecology, to restrict the term habitat to the "effective" environment for a single species, so that habitat becomes an autecological concept. Biotope is still a confusing term, meaning both the non-living counterpart of a biotic community and the total of non-living and living

environment within which an organism or minor community is to be found. Biotope is a topographical, habitat a functional concept. Cf. Lensink (1963). The biocenosis is more than a "loosely defined group of interacting organisms". It is still the fundamental concept concerning the biotic community of an ecosystem. For some European ecologists biocenosis equals ecosystem. Cf. Van der Maarel (1963).

The ecotone concept should be preserved more or less to its original significance as a "stress zone". In the recent considerations of Van Leeuwen (1964) the ecotone is interpreted as a transitional zone with sharp boundaries and a "coarse-grain structure", which has been termed limes convergens. The opposite is limes divergens, being a transitional zone with numerous micro-boundaries appearing vaguely as a whole, with a fine-grained structure. This type has something to do with the ecocline. (For its proper meaning and application see Van der Maarel and Westhoff, 1964).

Finally an objection must be made against the term level-of-integration in considering the possible approaches in ecology. This term should be restricted to the complexity status of the ecosystem (cf. Rowe, 1961). There is actually a small connection with integration. The sequence of approaches is more a logical than an integrational one.

These minor remarks do not retract from the value of this important book, however!

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E. VAN DER MAAREL

A. M. Mayer and A. Poljakoff–Mayber, The Germination of Seeds. Volume 3 of the Plant Physiology Division in the International Series of Monographs on Pure and Applied Biology. Pergamon Press Ltd., Oxford, 1963. 236 pp., 59 fig., 52 tables, 35 S. net.

This publication is justified as there are but few books specially dealing with seed germination and as that this subject is but briefly treated in the greater part of the text-books.

The authors give a good summary of the many factors influencing seed germina-

tion by reviewing a number of important papers and by arranging the available information in an integrated form. They conclude most chapters by a comprehensive bibliography.

The authors deal first with the structure of seeds and seedlings and with their chemical composition, but the greater part of the book is dedicated to the germination process. Much data are given with regard to the external factors affecting germination and to the interaction between them. The possible causes of dormancy are cited. The changes occurring in the storage products during germination, their possible biochemical pathways and the activity of enzymes and co-enzymes are discussed in a special chapter dedicated to the metabolism of germinating seeds. A few germination inhibitors and stimulators and the effect of these substances on the metabolism of germinating seeds and the role of hormones in seed germination are discussed. In a chapter on the ecology of germination an attempt has been made to relate the effect which various factors are known to exercise on germination, to the behaviour of seeds in their natural habitat. Here, the ecology is discussed—like in the first chapter the morphology—both as a subject in its own right and as a valuable source of knowledge for understanding germination.

Although this monograph gives a good survey of the whole field of seed germination, it would have been even better if the authors had payed some attention to the development of the germ and to dormancy during seed ontogeny. In the part dealing with substances influencing seed germination, inhibitor β is omitted.

Notwithstanding this, we can thoroughly recommend this useful book to all interested in the subject of seed germination.

C. KOLLÖFFEL

FRANK B. SALISBURY, The Flowering Process. Pergamon Press, Oxford–London–New York–Paris, 1963.

FRANK SALISBURY schreef in 1961 een overzicht over "Photoperiodism and flowering process" in "Annual Review of Plant Physiology". Uit de aard der zaak was dat een overzicht over de literatuur van de laatste jaren, dit onderwerp betreffend. Het boek dat hij nu heeft laten verschijnen is iets heel anders. De eerste hoofdstukken geven een overzicht over het probleem en maken maar al te duidelijk dat het hier geen eenvoudige zaak betreft. De latere hoofdstukken hebben een meer persoonlijk karakter. Soms lijkt het op hardop denken.

Vele overzichten geven een indeling in korte-dag planten, lange-dag planten en dag-neutrale planten, al dan niet koude-behoeftig. SALISBURY vindt terecht deze indeling veel te weinig gedetailleerd. Hij maakt een indeling in 48 groepen en geeft voorbeelden van elke groep. Men kan oordelen dat hij hierin weer te ver gaat, maar men zal moeten toegeven dat hoe verder de indeling, des te meer weet men van de eigenschappen van de planten die tot een bepaalde groep behoren. Als men bijvoorbeeld leest dat *Poa pratensis* behoort tot groep 41 en dus is een "absolute short, quantitative long-day plant which requires low temperature", dan krijgt men al een aardige indruk van de omstandigheden die nodig zijn om deze plant tot bloei te brengen.

Een goede niet te uitgebreide bespreking krijgen het endogene ritme, de rol van het phytochroom, vernalisatie, de vorming en ook het transport van het bloeihormoon.

Daar echter de biochemische achtergrond van deze onderwerpen nog altijd een duistere zaak is, vindt men in de laatste hoofdstukken zeer vele vraagtekens.

Wellicht zijn het juist deze vele vraagtekens die het boek zo waardevol maken voor onderzoekers die op het gebied van de bloei experimenteren.

Voor studenten is het boek aan te bevelen omdat het op een beknopte wijze de stand van de wetenschap op dit moment uiteenzet.

Aan hen die precies willen weten hoe de overgang van de vegetatieve naar de generatieve ontwikkeling van planten geschiedt, heeft FRANK SALISBURY zonder twijfel duidelijk gemaakt dat de wetenschappelijke inzichten hiervoor nog volkomen onvoldoende zijn.

R. VAN DER VEEN